Preventing Indoor Air Quality Problems During Construction and Renovation

Renovation can adversely impact Indoor Air Quality in occupied building areas. Symptoms include headache, eye, throat, and respiratory irritation, and an increase in asthma complaints. The following recommendations have been successful in reducing Indoor Air Quality complaints during building renovation activities.

I. COORDINATE CONSTRUCTION SCHEDULE

Communicate construction phases with building occupants, visitors (for school construction, teachers, parents and students). EPA's "Tools for Schools" packet includes sample letters.

Review Material Safety Data Sheets (not just Technical Bulletins) of all construction products for hazardous ingredients and their potential impact on indoor air quality.

Schedule activities which may generate excessive dust, noise or odors when the building is not occupied. Earmark time for building to be cleaned or ventilated before re-occupied.

Plan generous drying and off-gassing time for paints, carpets and roofing before occupying.

II. SEPARATE CONSTRUCTION AND OCCUPIED AREAS

Install permanent barriers to prevent building occupants from entering construction areas.

Prohibit occupant foot traffic in construction areas. Provide protected walkways if necessary. Prohibit contractor foot traffic in occupied areas.

Seal off HVAC ventilation supply and return ducts in construction area.

III. PREVENT DUST FROM MIGRATING TO OCCUPIED AREAS

Seal doors, windows, and other openings between construction areas and occupied areas, particularly classrooms, with an air-tight barrier. Seal both sides (inside the construction area, and inside the classroom) to provide a secondary dust barrier and prevent the doors and windows from being used. (Post alternative emergency exits, if applicable.)

Construction areas should be under negative pressure in relation to occupied areas.

Inspect polyethylene barriers daily, replace as necessary.

Do not transport building materials (sheetrock, insulation) through occupied areas.

Clean floors, lockers, and tables daily with wet methods (soap and water) or vacuum.

Do not dry sweep. Add additional custodial staff if necessary during the construction period.

Implement extra cleaning steps and dust controls for areas with mold growth, such as scrubbing the area and filtered ventilation. Construction specs should include correction of moisture problem to prevent re-growth of mold.

Use covered chutes to lower construction debris from upper floors.

Wet down construction debris and uncovered dirt, as necessary to reduce dust kicked up by wind.

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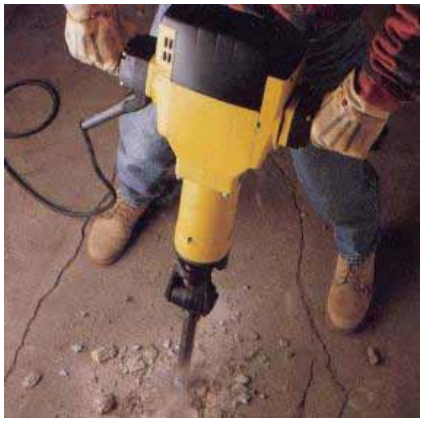
DUST: Jackhammering, Abrasive Blasting



Schedule high-dust activities when building is not occupied.

Construct air-tight barriers between construction area and occupied areas. Inspect barriers on the occupant side continually during jackhammering and blasting work for dust emissions.

Stop construction work if visible dust is observed in adjacent non-construction areas. Improve construction area ventilation and barriers before work resumes.

Provide ventilation inside work area to pull dust away from workers and occupied areas (similar to asbestos negative pressure ventilation).

Do not clean work areas with compressed air.

Check and clean adjacent occupied areas following barrier removal before re-occupying.

IV. PREVENT EXPOSURE TO HAZARDOUS CHEMICALS IN CONSTRUCTION PRODUCTS

Obtain manufacturer's Material Safety Data Sheets (MSDS) for all products used during the project (obtain MSDS in addition to Technical Bulletins). Review for hazardous ingredients, particularly:

Formaldehyde: Can trigger asthma, eye, throat and skin irritation.

Isocyanates: Can cause asthma and allergic reactions at very low concentrations.

Avoid **Carbon Monoxide** problems from propane heaters, forklifts, and truck exhaust. Reduce carbon monoxide emissions through frequent equipment maintenance, and ventilation.

Plywood, particleboard, carpets - Specify the purchase of low emission products (avoid products that use urea-formaldehyde resins).

ISOCYANATE PRODUCTS - Paints and Roofing Materials

All two-part epoxy paints and sealants should be suspected of containing isocyanates.
Review MSDS for determination.
Isocyanates require extra precautions for workers and occupants.

Substitute a non-isocyanate product if possible.

Do not apply isocyanate products while any area of the building is occupied.

Confirm there is adequate ventilation and proper respiratory protection for workers in work area.

Seal HVAC supply and return ventilation ducts inside construction area to prevent vapor migration to other areas. Seal rooftop air intakes for all building areas during roof work.

Apply products within weather conditions specified by manufacturer. Incorrect temperature and humidity prevents effective curing rates and can postpone timely re-occupancy of the building.

After application of an isocyanate product, plan for generous curing and drying times before <u>any</u> area of the building is re-occupied (not just the painted area).

V. ASBESTOS AND LEAD

Inspect areas prior to work for Asbestos and Lead containing materials.

Paint on interior and exterior surfaces (walls, windows, woodwork, shingles) should be tested for lead, or presumed to contain lead. Lead dust can be generated when painted surfaces are disturbed by chipping, sanding, or removal of woodwork.

Asbestos and Lead which could become damaged should be removed properly before renovation. Asbestos removal requires a licensed Asbestos Abatement Contractor.

A licensed Lead Abatement Contractor is required for residences, and is recommended for schools, offices and other facilities to ensure workers and building occupants are protected.

Air samples should be collected during and after asbestos and lead removal to ensure that dusts are not migrating to other areas. Surface wipe samples should be collected after lead removal.

VI. RESPONDING TO ACUTE EPISODES OF INDOOR AIR QUALITY COMPLAINTS

Unexpected releases of dust or odors into non-construction areas could cause an episode of headache, nausea, or respiratory complaints among building occupants. The following action is recommended:

Stop construction work. Determine source of release.

Remove other occupants from area of building where symptoms occurred.

Implement engineering or administrative corrections, such as:
- Improve construction area ventilation.
- Ventilate non-construction areas with fresh air.
- Repair and replace airtight barriers between construction and non-construction areas.
- Clean non-construction areas with wet mopping and HEPA vacuum methods.
- Move the offending activity to a non-occupied time period.

Perform air monitoring for chemical contaminants if applicable. Do not occupy affected areas until testing confirms that chemical or dust concentrations are not hazardous.

VII. BUILDING VENTILATION

Many indoor air quality problems result from an inadequate supply of fresh air to occupied areas.

Locate outside air intakes and ensure louvers are operating, open and unobstructed. Air intakes should not be located next to, or downwind from: exhaust vents; loading docks; rest room exhaust vents; or cooling towers.

Check all thermostat controls. Fans should be set on the "ON" setting and not to "AUTO."
The "Auto" setting only provides ventilation when the thermostat demands heating or cooling.
The "On" setting will provide a constant supply of fresh air.

Filters on ventilation units should be replaced with a regular frequency (often seasonally).

Building heating and ventilation system should be on a preventative maintenance schedule.